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Map color theorem, by Gerhard Ringel, Springer-Verlag, New York, Heidelberg, Berlin, 1974, 191+xii pp., $22.20

The four color conjecture is a famous problem that has challenged and stimulated mathematicians for more than a century. As most mathematicians know, it consists of the statement that with four colors one can color any map on a sphere such that any two countries with a boundary edge in common are of different colors. The present volume concerns a related problem: how many colors are necessary to color all similarly colored maps on surfaces of higher genus?

This problem has an entirely different flavor, as we shall see; it has a long history as well. It was posed by Heawood, who thought he had proven his conjectured answer in 1890. The last case was solved in 1968 (most cases solved by the author) verifying the original conjecture. A complete description in remarkably clear language of solutions for all cases is presented in this volume, which is written at a level suitable for an undergraduate seminar.

The major difference between the sphere problem and higher genus-surface problems is this: On a sphere one knows that one cannot have five countries every pair of which are neighbors—a configuration obviously requiring five colors—but one does not know if there is some large